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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/998,519	11/27/2001	Shih-Zheng Kuo	JCLA8198	5384

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EXAMINER	
THOMPSON, JAMES A	
ART UNIT	**PAPER NUMBER**
2624	

DATE MAILED: 05/31/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/998,519	KUO, SHIH-ZHENG	
	Examiner	Art Unit	
	James A. Thompson	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 November 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☒ Claim(s) *7* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 November 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Applicant is advised that should claim 3 be found allowable, claim 7 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Examiner notes that claim 7 recites "[t]he sensing method according to claim 1", which is the same dependency that claim 3 possesses. Although this is clearly an unintentional error, claim 7 currently recites the same limitations as claim 3.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 2 recites "the distance is equal to (x/m)+n times of the width". However, in claim 1, from which claim 2 depends, there are two types of "distance" mentioned. There is the spacing distance between rows of sensors recited in claim 1, lines 3-4 and the distance the motor moves, which is equal to

the width of one row of the sensors, recited in claim 1, line 5. Which "distance" is the antecedent of the "distance" in claim 2?

For the purpose of examining claim 2 over the prior art, Examiner will interpret "distance" in claim 2 to mean the spacing distance between rows of sensors, as recited in claim 1, lines 3-4, since this interpretation is consistent with the specification (ΔL in figures 3-6 and para. 16 of the present specification).

4. Claim 6 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 6 recites "the distance is equal to n times the width". However, in claim 5, from which claim 6 depends, there are two types of "distance" mentioned. There is the spacing distance between rows of sensors recited in claim 5, lines 3-4 and the distance the motor moves, which is equal to m/(m+1) times the width of one row of the sensors, recited in claim 5, lines 5-6. Which "distance" is the antecedent of the "distance" in claim 6?

For the purpose of examining claim 6 over the prior art, Examiner will interpret "distance" in claim 6 to mean the spacing distance between rows of sensors, as recited in claim 5, lines 3-4, since this interpretation is consistent with the specification (ΔL in figure 6 and para. 39 of the present specification).

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

6. Claims 1-2 and 4 are rejected under 35 U.S.C. 102(a) as being anticipated by Boyd (US Patent 6,166,831).

Regarding claim 1: Boyd discloses moving the motor (column 2, lines 44-46 of Boyd) a distance equal to a width of one row of the sensors at a speed equal to the width divided by an exposure time (figure 3 and column 3, lines 16-20 of Boyd). Row **30** is read when signal A (figure 3(54) of Boyd) is high and row **32** is read when signal B (figure 3(56) of Boyd) is high (column 3, lines 16-20 of Boyd). Moving either the sensor or the paper in a scanner system (column 2, lines 44-46 of Boyd) inherently requires some form of motor. Since sensor reading is performed in equal times for each row (figure 3 of Boyd), then said motor moves at a constant speed. The high signal time of the waveform of either row (figure 3(54,56) of Boyd) is the exposure time for the associated row. Given the very basic and well-known equation $\{speed\} = \{distance\}/\{time\}$, it is therefore demonstrated that the motor moves a distance equal to a width of one row of the sensors at a speed equal to the width divided by an exposure time, or $\{speed\} = W_1/(t_2 - t_1) = W_2/(t_3 - t_2)$ (figure 3(54,56) and column 3, lines 16-20 of Boyd).

Boyd further discloses using m (m=2) rows of the sensors (figure 2(30,32) of Boyd) to scan during the exposure time (column 3, lines 16-20 of Boyd), so as to obtain a plurality of

staggered image signals (column 3, lines 1-9 of Boyd). By staggering the image signals of two rows (column 3, lines 7-12 of Boyd), the resolution is doubled (column 3, lines 11-15 of Boyd).

Regarding claim 2: Boyd discloses that the rows of sensors are spaced a distance equal to $(x/m)+n$ times of the width, wherein x is a positive integer smaller than m, and n is an integer equal to or larger than 0 (column 3, lines 9-15 of Boyd). In the system taught by Boyd, the resolution is increased by a factor of two (column 3, lines 11-15 of Boyd) for two rows (column 3, lines 7-10 of Boyd), and thus m is equal to 2, the spacing distance is one half (column 3, lines 9-12 of Boyd), and thus x is equal to one, which is a positive integer smaller than m. Further, due to the compact staggering of the sensors (figure 2(30,32) of Boyd), n is an integer equal to 0.

Regarding claim 4: Boyd discloses that the staggered image signals are processed and re-sorted to obtain a plurality of image data (figure 5(60,62,64) and column 4, lines 7-15 of Boyd).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 3 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boyd (US Patent 6,166,831) in view of Teeter (US Patent 4,451,030).

Regarding claims 3 and 7: Boyd does not disclose expressly that the motor is a step motor.

Teeter discloses a scanner with sensing elements which are driven by a step motor (figure 3(84) and column 3, lines 49-51 of Teeter).

Boyd and Teeter are combinable because they are from similar problem solving areas, namely the mechanical control of sensing elements in a digital scanner. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to specifically use a step motor, as taught by Teeter, in the scanner taught by Boyd. The suggestion for doing so would have been that a step motor is a useful type of motor to control with stepped electrical driving pulses (column 4, lines 46-51 of Teeter), such as also taught by Boyd (figure 3 of Boyd). Therefore, it would have been obvious to combine Teeter with Boyd to obtain the invention as specified in claims 3 and 7.

9. Claims 5-6 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boyd (US Patent 6,166,831) in view of Shimizu (US Patent 5,777,308).

Regarding claim 5: Boyd discloses moving the motor (column 2, lines 44-46 of Boyd) a distance equal to a width of one row of the sensors at a speed equal to the width divided by an exposure time (figure 3 and column 3, lines 16-20 of Boyd). Row **30** is read when signal A (figure 3(54) of Boyd) is high and row **32** is read when signal B (figure 3(56) of Boyd) is high (column

3, lines 16-20 of Boyd). Moving either the sensor or the paper in a scanner system (column 2, lines 44-46 of Boyd) inherently requires some form of motor. Since sensor reading is performed in equal times for each row (figure 3 of Boyd), then said motor moves at a constant speed. The high signal time of the waveform of either row (figure 3(54,56) of Boyd) is the exposure time for the associated row. Given the very basic and well-known equation $\{speed\}=\{distance\}/\{time\}$, it is therefore demonstrated that the motor moves a distance equal to a width of one row of the sensors at a speed equal to the width divided by an exposure time, or $\{speed\}=W_1/(t_2-t_1)=W_2/(t_3-t_2)$ (figure 3(54,56) and column 3, lines 16-20 of Boyd).

Boyd further discloses using, for a resolution increase of $(m+1)$ (column 3, lines 11-15 of Boyd $(m=1)$), $(m+1)$ rows of the sensors (figure 2(30,32) of Boyd) to scan during the exposure time (column 3, lines 16-20 of Boyd), so as to obtain a plurality of staggered image signals (column 3, lines 1-9 of Boyd). By staggering the image signals of two rows (column 3, lines 7-12 of Boyd), the resolution is doubled (column 3, lines 11-15 of Boyd).

Boyd does not disclose expressly moving the motor a distance equal to $m/(m+1)$ times the width of one row of the sensors in a speed equal to $m/(m+1)$ times the width divided by an exposure time; and using m rows of sensors (for a resolution enhancement of $(m+1)$) to scan during the exposure time.

Shimizu discloses increasing the resolution of a scanner (column 3, lines 9-16 of Shimizu) by sampling at a particular angle (figure 3(42) and column 5, lines 26-28 and lines 39-45 of Shimizu).

Boyd and Shimizu are combinable because they are from the same field of endeavor, namely the enhancement of scanner resolution through angled pixel data. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to apply various different angles to increase scanner resolution, as taught by Shimizu, than the 45° angle between rows used for staggering in the system taught by Boyd. Thus for a general case of a system taught by Boyd in view of Shimizu, m rows of sensors would be used to scan during the exposure time, thus obtaining a resolution enhancement of $(m+1)$ for certain specified angles. Further, in a general case of a system taught by Boyd in view of Shimizu, the motor would therefore move a distance equal to $m/(m+1)$ times the width of one row of the sensors. Since, as has been demonstrated above in the system of Boyd, the motor moves the sensors at a constant rate during the exposure time, the motor would therefore move a distance equal to $m/(m+1)$ times the width of one row of the sensors in a speed equal to $m/(m+1)$ times the width divided by an exposure time. The suggestion for doing so would have been that the system taught by Shimizu achieves through angled sampling a resolution smaller than a single pixel (column 3, lines 9-15 of Shimizu), which is also the goal of the system taught by Boyd (column 3, lines 11-15 of Boyd). Therefore, it would have been obvious to combine Shimizu with Boyd to obtain the invention as specified in claim 5.

Further regarding claim 6: For a particularly selected angle for staggering, such as 45° ($\tan^{-1}(1/1)$) or 33.69° ($\tan^{-1}(2/3)$), using the system taught by Boyd in view of Shimizu as discussed above in the arguments regarding claim 5, the spacing distance

between rows will be equal to n times the width, wherein n is an integer equal to or larger than 0.

Regarding claim 8: Boyd discloses that the staggered image signals are processed and re-sorted to obtain a plurality of image data (figure 5(60,62,64) and column 4, lines 7-15 of Boyd).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Thompson whose telephone number is 571-272-7441. The examiner can normally be reached on 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K. Moore can be reached on 571-272-7437. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James A. Thompson
Examiner
Art Unit 2624

JAT
09 May 2005

THOMAS D
~~TOMMY~~ LEE
PRIMARY EXAMINER